

WHAT IS CLAIMED IS:

1. A toner-supplementing device in which a toner-storing segment is placed outside an image-forming range of an image-forming device, toner is transferred from the toner-storing segment to a toner-supplementing segment of a developer device and the toner is supplemented to a toner-supplementing area having a predetermined width at the toner-supplementing segment, wherein there are provided:

a conduit having an upstream side one end fixed to the developer device;

a cylindrical member closely contacted with the other end of the conduit, rotatable around its axis, and having a desired number of small slit-like toner-supplementing ports which have their center being placed on an inclined line in respect to an axial direction in a developed plane of a circumferential wall and are punched with their phase being displaced in a circumferential direction and in parallel with the axial direction; and

a toner-transferring member for transferring toner from the upstream one end toward the other downstream end inside the toner-supplementing cylindrical member.

2. The toner-supplementing device according to Claim 1, wherein the toner-supplementing ports are punched in a substantial equal-spaced apart relation in an axial direction on an inclined line in one direction of a circumferential wall of the toner-supplementing cylindrical

member and with their phases being displaced substantially equally in a circumferential direction.

3. The toner-supplementing device according to Claim 1 or Claim 2, wherein a helical toner-feeding protrusion of slight height is protruded between each of the toner-supplementing ports at the circumferential wall of the toner-supplementing cylindrical member.

4. The toner-supplementing device according to Claim 2 or Claim 3, wherein the toner-supplementing cylindrical member is a conical cylinder with its diameter being gradually decreased from one end toward a downstream direction or a cylinder having the same diameter over its entire length and inclined with its circumferential wall being descended toward the downstream direction.

5. The toner-supplementing device according to Claim 1 or Claim 2, wherein a coil spring is extended within the conduit and the toner-supplementing cylindrical member and can be cooperatively related with the toner-supplementing cylindrical member.

6. The toner-supplementing device according to Claim 5, wherein an auger is extended in place of the coil spring in the toner-supplementing cylindrical member.

7. The toner-supplementing device according to Claim 5 or Claim 6, wherein a partition wall formed with an opening

corresponding to a toner-supplementing area is arranged while a slight clearance being arranged between the toner-supplementing segment and the toner-supplementing cylindrical member of the developer device, and there is provided an area not punched with a toner-supplementing port having a width slightly larger than a circumferential width of the partition wall in a circumferential direction of the toner-supplementing cylindrical member.

8. The toner-supplementing device according to Claim 7, wherein a pipe member having a diameter slightly larger than that of the toner-supplementing cylindrical member formed with an opening corresponding to the toner-supplementing area is immovably fixed in place of the partition wall and the toner-supplementing cylindrical member is caught in and attached to the pipe member.

9. The toner-supplementing device according to Claim 7 or Claim 8, wherein the toner-supplementing ports in an axial direction of the toner-supplementing cylindrical member are arranged in response to a plurality of sizes of a printing medium applied to the developer device, they are spaced apart with an area not punched with toner-supplementing ports being placed at the midway part and have a difference in range in an axial direction.

10. The toner-supplementing device according to Claim 9, wherein a size of the printing medium is detected and either a wide range or narrow range of the toner-

supplementing ports can be selected and controlled in accordance with a program loaded in a control segment of an image forming device.

11. A toner-agitating member in which an agitating coil of a coil spring having an outer edge shape extending along an inner surface of a toner-storing segment and rotatable around its axis is stored in the toner-storing segment under its compressed state, a connecting member punched with an openable or closable toner-supplying port is arranged at the extremity end of the toner-storing segment, the toner-supplying port is closed and the agitating coil is stored in the toner-storing segment when the toner-storing segment is not installed at a developer device, and the toner-supplying port is released when the toner-storing segment is installed at the developer device to enable the extremity end of the agitating coil to be protruded.

12. The toner-agitating member according to Claim 11, wherein an end part of a coil-shaped wire member is continuous to one upstream end of the coil spring of the toner-supplementing device according to any one of Claims 1 to 10, an engaging segment traversing in a linear line manner across the center of the coil spring to divide it is formed in the coil-shaped wire member, a connecting piece fixed to the extremity end of the agitating coil is formed in such a way that a slit-groove is arranged at each of the central parts of a pair of substantial semi-circular plate members and the plate members are crossed and fixed at a

right angle around the slit-groove applied as a center, the engaging segment is entered into the slit-groove protruded from the toner-supplying port when the toner-storing segment is installed into the developer device, and the agitating coil can be rotated in cooperation with a turning of the coil spring.